

WELDING AND CUTTING

OSHA Standard CFR 29 1910.252

Today's construction workers in welding and cutting must not only protect themselves from injury but also must assume responsibility for their helpers, co-workers in other trades and, in some instances, the sidewalk superintendent. Accident records indicate that other people near arc welding operations are injured more often than the welder.

There is also the ever-present chance of fire. In addition to causing serious injuries, fires from welding and cutting cost hundreds of thousands, sometimes millions of dollars annually.

Accident records show that certain conditions and/or actions cause most cutting and welding accidents. Precautions that will prevent many types of accidents include:

1. Before starting to weld in a confined space, be sure you have the proper permit, your supervisor's permission, and that there is proper ventilation.
2. Keep a correct type fire extinguisher handy and within reach at all times.
3. Inspect all work areas and place required shields or blankets before welding or cutting. See that there are no explosives, dangerous gasses, or flammable materials nearby.
4. Be sure all floor gratings are covered, with no cracks, through which sparks can drop to levels below.
5. Don't allow co-workers to stand too near the work or stare at the art.
6. Your helper must be as well equipped as you are, and must be wearing the proper type of eye protection.
7. Always inspect cutting and welding equipment before starting work.
8. Keep oil and grease away from oxygen valves.
9. Oxygen and acetylene cylinders should be tied off at all times.
10. When welding and cutting there may be times that you need a fire watch assigned to your work. Check with your supervisor.

SAFE WELDERS ALWAYS SET THE EXAMPLE, INSTRUCT THEIR HELPERS PROPERLY, AND NEVER TAKE CHANCES.

Welding Safely

Welding hazards pose an unusual combination of safety and health risks. By its nature, welding produces fumes and noise, gives off radiation, involves electricity or gases, and has the potential for burns, shock, fire, and explosions.

Some hazards are common to both electric arc and oxygen-fuel gas welding. If you work with or near a welding operation, the following general precautions should help you to work more safely.

- Weld only in designated areas.
- Only operate welding equipment you have been trained to use.
- Know what the substance is that's being welded and any coating on it.
- Wear protective clothing to cover all exposed areas of the body for protection sparks, hot spatter, and radiation.
- Protective clothing should be dry and free of holes, grease, oil, and other substances which may burn.
- Wear flameproof gauntlet gloves, a leather or asbestos apron, and high-top shoes to provide good protection against sparks and spatter.
- Wear specifically designed, leak-proof helmets equipped with filter plates to protect against ultraviolet, infrared, and visible radiation.
- Never look at a flash, even for an instant.
- Keep your head away from the plume by staying back and to the side of the work.
- Use your helmet and head position to minimize fume inhalation in your breathing zone.
- Make sure there is good local exhaust ventilation to keep the air in your breathing zone clear.
- Don't weld in a confined space without adequate ventilation and a NIOSH-approved respirator.
- Don't weld in wet areas, wear wet or damp clothing or weld with wet hands.
- Don't weld on containers which have held combustible materials or on drums, barrels or tanks until proper safety precautions have been taken to prevent explosions.

- If others are working in the area be sure they are warned and protected against arcs, fumes, sparks, and other welding hazards.
- Don't coil the electrode cable around your body.
- Ground both the frame of the welding equipment and metal being welded.
- Check for leaks in gas hoses using an inert gas.
- Check area around you before welding to be sure no flammable material or degreasing solvents are in the welding area.
- Keep a fire watch in the area during and after welding to be sure there are no smoldering materials, hot slag or live sparks which could start a fire.
- Locate the nearest fire extinguisher before welding.
- Deposit all scraps and electrode butts in proper waste container to avoid fire and toxic fumes.

Arc Welding Safety

Safe and accident free completion of any welding operation should be the goal of all welders. Here are a few welding safety tips that will help you achieve that goal.

Wearing proper eye protection is very important. Welders and their helpers should be sure to use the correct filter lens in their goggles or helmets to protect their eyes from infrared and ultraviolet light. (See 1926.102, Tables E-1 and E-2 for a guide to eye and face protection and filter lens shade numbers.)

Precautions for fire prevention must be taken in areas where welding is being done, for example, isolating the welding and cutting area and removing fire hazards from the vicinity. If normal fire prevention precautions are not sufficient, a qualified person should be assigned to guard against fire during the operation and for a suitable time after completion of the work, to ensure that no possibility of fire exists. Be sure that fire extinguishing equipment is available and ready for immediate use. In areas where heavy dust concentrations exist, or where flammable paints or other flammable materials are present, welding, cutting or heating can create a significant fire hazard. Proceed with extreme caution!

A noncombustible or flameproof screen should isolate the welding or cutting area to protect other workers in the vicinity from direct arc rays. Watch your slag; it could cause a serious injury to someone working below. I

If the electrode holder is left unattended, the electrodes must be removed, and the holder must be placed so that electrical contact cannot be made with another employee or any conducting object.

All arc welding and cutting cables must be completely insulated and capable of handling the maximum current requirements for the job. The insulation on any splice within 10 feet of the electrode holder must be equal to the insulation of the cable.

Review 1926.351 through 1926.354 for additional information

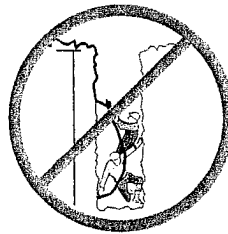
All welding and cutting operations in a confined space shall be ventilated to prevent the accumulation of I toxic materials or possible oxygen deficiency



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Safety Tips

Working safely in trenches

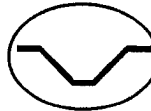


Do NOT enter an unprotected trench!

Each employee in a trench shall be protected from a cave-in by an adequate protective system.

Some of the protective systems for trenches are:

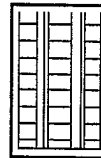
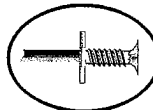
- Sloped for stability; or



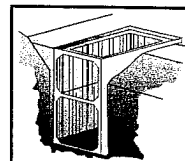
- Cut to create stepped benched grades; or



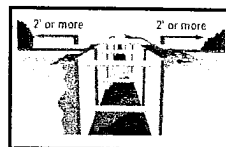
- Supported by a system made with posts, beams, shores or planking and hydraulic jacks; or



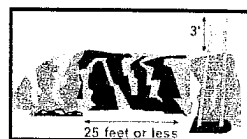
- Supported by a trench box to protect workers in a trench.



Additionally, excavated or other materials must be at least 2 feet back from the edge of a trench; and



A safe means of egress shall be provided within 25 feet of workers in a trench.



For more complete information:



Occupational
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U.S. Department of Labor
www.osha.gov (800) 321-OSHA
TTY (877) 889-5627

OSHA 3243-03R-05

Welding, Cutting and Brazing

Safety Training Handout

■ **What are the hazards of welding, cutting and brazing?**

- **Safety Hazards** include: danger of fire and explosions; confined space, fall and electrical hazards; compressed gas cylinders and their contents
- **Health Hazards:** Welding fumes and smoke; heat and sparks; visible, ultraviolet and infrared radiation; musculoskeletal injuries; and noise

■ **How can fires be avoided?**

- **Assess the fire hazards**
 - If object to be welded or cut can't be readily moved, remove all fire hazards in vicinity
 - If both object and fire hazards can't be move, use guards to confine heat, sparks and slag
 - If above two requirements can't be met, then welding shouldn't be performed
- **Fire extinguishers:** must be in state of readiness for instant use
- **Fire watchers:** must be maintained for at least 1/2 hour after completion of job for locations where more than a minor fire might develop or where appreciable combustible materials are present
- **Welding is prohibited** in areas not authorized by management, in buildings with impaired sprinkler systems, or where explosive atmospheres are present or may develop
- Never work on used drums barrels, tanks or other containers until they have been thoroughly cleaned

■ **How can you stay safe from:**

- **Falls:** (1) When working at height, use railing, safety belts, lifelines or other equally effective safeguards; (2) Keep cables and other equipment clear of passageways, ladders or stairways
- **Eye Injuries:** Wear helmets, shields and goggles fitted with proper filter shades during welding or cutting
- **Limb and Torso burns:** Wear welding gloves, gauntlets and sleeves; leather aprons; high safety boots and legging; heavyweight, full-sleeve wool shirts, with collars buttoned & no pockets; and pants without cuffs that extend over boots
- **Fume hazards:** Ensure adequate ventilation for all jobs. Use local exhaust ventilation. Respirators must be worn when cancer-causing agents are present. Materials requiring extra precautions include: Fluorine compounds, zinc, lead, beryllium, cadmium, mercury, cleaning compounds, stainless steel

■ **How to work safely in confined spaces:**

- **Personal Protection:** always acquire confined space permit; ensure adequate ventilation; Test before entering for flammable/toxic gases; use respirator if local ventilation proves inadequate; disconnect pipes, ducts and power lines; leave gas cylinders and welding machines outside the confined space; have attendant present ready to rescue; wear safety harness or lifeline.
- **Fire Prevention:** When arc welding is suspended, remove electrodes from holders and disconnect machine from power source. When gas welding is suspended, close the torch valves, shut gas supply to torch and remove torch and hose (where practical).

■ **Compress Gas cylinders**

- **Storage:** In upright position with caps on and secured with straps or chains in well-ventilated, dry, location <20 ft away from highly combustible materials such as oil. Oxygen and Acetylene: separated by 20 ft. or 1/2-hour fire wall. Away from sources of heat and ignition and high traffic areas.
- **Transporting:** Secure to wheeled hand cart with regulator removed; never use valve caps to lift
- **Prior to work:** Inspect cylinder for damage, make sure contents are clearly labeled, and refer to MSDS for specific hazards, special handling instructions, emergency response and first aid information.
- **General safety:** Cylinders remain in upright position at all times; Cylinders and valve caps are kept free from oil or grease. Valve protection caps are always in place when not in use (empties included)
- **Placement during use:** cylinders must be placed where sparks, hot slag or flame can't reach them. If this is not possible, use fire-resistant shields. Never place where can become part of an electric circuit - check for grounding. Cylinders must be placed outside of any confined space
- **To use:** "Crack" the cylinder valve, ensure regulators are compatible, clean and in good condition, and hoses and connections are secure; keep any vendor-supplied keys in place and valves within easy reach
- **For Safe Use of Acetylene:** Never open acetylene valve more than 1 1/2 turns, use acetylene at pressure in excess of 30 psi absolute of 15 psi gage or use copper fittings or connections